

SIT AND REACH**TABLE OF CONTENTS**

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SIT AND REACH

1. Background and rationale

Health ABC has measured the performance of the cohort with respect to strength and endurance but has no measure of flexibility. There is relatively little published data regarding the relationship between gross flexibility and the functional health of older adults. However, flexibility decreases with increasing age,¹ decreased in less active older women,² and is related to independent activities of daily living (IADL) impairment.³ Lower back flexibility is related to back pain which is very common in the Health ABC study (At year 2, 44% reported back pain and 12% reported activity restriction secondary to back pain). It is suspected that flexibility is related to gait characteristics such as stride length, and thus may determine walking speed, an important intermediate end-point of the study.

2. Equipment and supplies

- Standardized Sit and Reach Box
- Tape measure
- Wet-erase overhead transparency pen (Sanford Vis-à-vis)

3. Safety issues and exclusions

This test should not be performed if a participant has had a hip replacement.

4. Participant and exam room preparation

Timing of the test: Ideally, participants should be warmed up before the test. It might not be possible to constrain the test so that it is done after the walk test, but it should be done on the DXA table prior to the DXA scan so the measure can be obtained before muscles tighten up.

The participant's arm must be measured before they sit on the exam table used for the DXA measurement. The participant should be standing for the arm measurement and then sitting with their shoes off on the DXA exam table for the back length measurement and sit and reach test.

5. Detailed measurement procedures

- 1) Determine if the participant has had a hip replacement.

Script: “Have you ever had hip replacement surgery where all or part of your joint was replaced?”

If the participant answers, “Yes,” do not administer the sit and reach test. Mark the answer on the sit and reach data collection form, and go on to the next test.

- 2) Introduce the test. This test is designed to see how flexible you are. Before we begin I’ll need to measure your arm length and your back length.

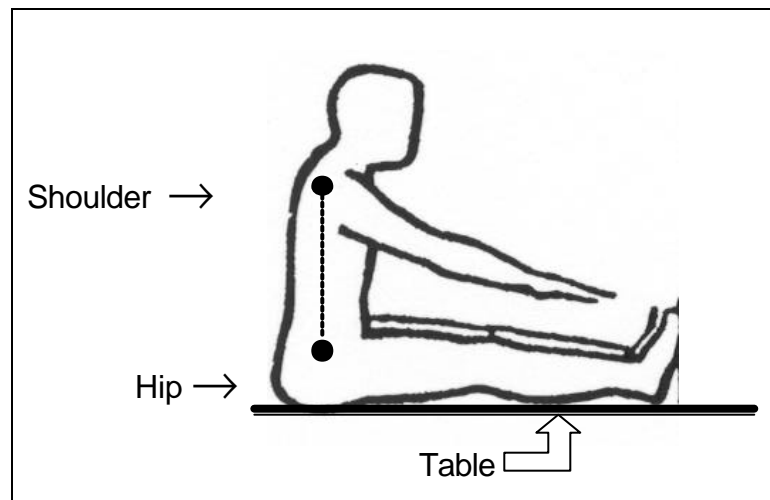
- 3) Measure the participant’s arm length.

The arm length measure can be obtained while the participant is standing with their elbow straight. Find the bony prominence on the outside of the shoulder. Measure from this point to the end of the longest finger. If one arm appears longer than another, measure the longer of the two.

Record the participant’s arm length on the data collection form.

- 4) Measure the participant’s back length

Ask the participant to sit on the DXA exam table. See figure below:



Straight Leg Position

The participant's back length is measured after the participant sits with their shoulders over their hips, and their legs straight out in front of them on the table; i.e., the long-sit position. Measure from the bony prominence on the outside of the shoulder straight down to the table-top.

Record the participant's back length on the data collection form.

5) Administer the sit and reach test.

a) establish the starting position

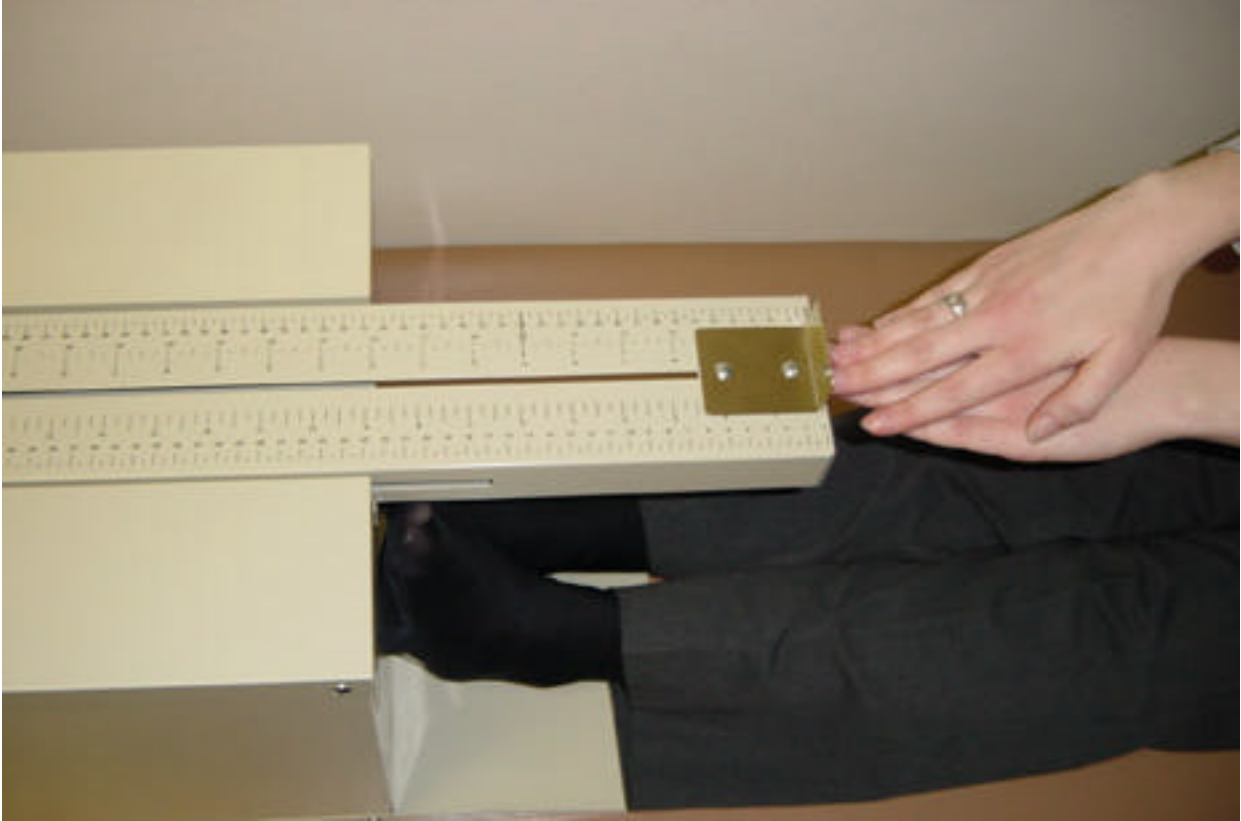
Position the sit and reach box so that the balls of the participant's feet are resting on the front of the box. The participant's knees should be as straight as possible (see Picture 1 below).



Picture 1

The sliding ruler should be all the way back with the finger plate all the way forward. Have the participant sit in a relaxed position, the shoulders directly over the hips. Ask the participant to put both arms straight out in front, fingers pointed with one hand

directly over the other hand, palms down. Extend the sliding ruler so that the participant's fingers are touching the finger plate (see Picture 2 below).



Picture 2

This is the starting position, record the start measure by reading where scale A on the sliding ruler crosses the front of the box. Mark the sliding ruler at the junction with front of the box with a wet-erase overhead transparency pen (Sanford Vis-à-vis).

Record the location of the ruler to the nearest .5 cm. Use Scale A. This is recorded as "Starting ruler position" on item #4 on page 12 in the Year 6 Clinic Visit Workbook. Once the initial position of the sliding ruler is set it should not change for the duration of the test. The examiner should hold it in place while testing is underway, and it helps to insert a folded piece of cardboard into the slot in which the ruler rests to help keep the ruler stationary.

There will be one practice and three to five measurements.

b) Describe the measure to the participant.

Script: "This test is designed to see how flexible you are. Please sit comfortably with your arms straight and your fingers pointed at the metal plate (point to the finger

plate). When I say ‘go’ I want you to lean forward slowly as far as you can, pushing this plate ahead of you. Don’t jerk forward or bounce. Don’t bend your knees. We’re going to do this several times.”

c) Administer practice test

Examiner: Hold the ruler in place.

“This first time is just practice. Ready . . . go. “STRETCH, STRETCH, STRETCH” OK. Good.”

Ask the participant, “How did that feel? Did it hurt?”

If it hurts ask the participant if they would care to stop or are they willing to keep going.

- Record Plate measure for practice test.

Before administering the second test, push the finger plate all the way forward on the sliding ruler, and make sure the sliding ruler hasn’t moved from the starting position.

d) Administer test

Between each test the examiner must make sure the sliding ruler is in it’s original position, and the finger plate is all the way forward. If the participant moves the ruler or bends their knees, do not record the results of that test. Begin the test again.

We’re going to try it again. Remember, slowly lean forward as far as you can. Don’t jerk forward or bounce. Ready . . . go. “STRETCH, STRETCH, STRETCH” OK. Good.

- Record Plate measure for Trial 1

Wait 10 seconds.

OK, Let’s do this again. Ready . . . go. “STRETCH, STRETCH, STRETCH” OK. Good.

- Record Plate measure for Trial 2

Wait 10 seconds.

OK, Let's do this again. Ready . . . go. "STRETCH, STRETCH, STRETCH" OK. Good.

- Record Plate measure for Trial 3

Very good. How do you feel?

Is Plate measure 3 greater than Plate measure 1 and 2?

If "No," the test is over. Record "No" on data collection form, thank the participant and go on to the next test.

If "Yes," do a fourth measurement.

Ready . . . go. "STRETCH, STRETCH, STRETCH" OK. Good.

- Record Plate measure for Trial 4

Very good. How do you feel?

Is Plate measure 4 greater than Plate measure 1, 2, and 3?

If "No," the test is over. Record "No" on data collection form, thank the participant and go on to the next test.

If "Yes," do a fifth measurement.

Ready . . . go. "STRETCH, STRETCH, STRETCH" OK. Good.

- Record Plate measure for Trial 5

Very good. How do you feel?

When the testing is done, use a damp paper towel to erase the mark put on the box to show the starting position.

6. Procedures for performing the measurement at home

This test will not be administered in the home.

7. Alert values/Follow-up/Reporting to participants

When the test is completed tell the participant how many centimeters they reached on their furthest reach.

8. Quality assurance

8.1 Training requirements

The technician requires no special qualifications for performing this assessment. The training should include:

- Read and study manual
- Attend Health ABC training session on techniques (or observe administration by experienced examiner)
- Practice on other staff or volunteers
- Discuss problems and questions with local expert or QC officer

8.2 Certification requirements

- Complete training requirements
- Recite exclusion
- Conduct exam on 2 volunteers:
 - According to protocol, as demonstrated by completed QC checklist
 - $< \pm 3$ cm on repeat assessment of volunteer

8.3 Quality assurance checklist

- ☐ Participant is asked about whether or not they've had a hip replacement.
- ☐ Initial positioning demonstrated
- ☐ Longest arm is measured from bony prominence on the outside of the shoulder to the end of the longest finger.
- ☐ Participant is in a long sit position with their knees as straight as possible
- ☐ Back length is measured from the bony prominence on the outside of the shoulder straight down to the table-top.
- ☐ Participant's ankles are relaxed.
- ☐ Sit and reach box placed properly
- ☐ Sliding ruler all the way back with finger plate all the way forward
- ☐ Sliding ruler extended and participant's fingers touching the finger plate
- ☐ Correct instructions to participant
- ☐ Starting ruler position recorded
(where scale A on the sliding ruler crosses the front of the box)
- ☐ Sliding ruler marked with transparency pen
- ☐ Ruler held in place while testing
- ☐ Practice test done correctly
- ☐ Returns the box to the same starting point between each trial.
- ☐ Ten seconds between each test
- ☐ Standard encouragement offered to participant
- ☐ Key points from script delivered clearly
- ☐ At least three measurements taken
- ☐ Fourth measurement taken if third measurement is greater than first and second measurement.
- ☐ Fifth measurement taken if fourth measurement is greater than first, second, and third measurement.
- ☐ Reviews form for completeness
- ☐ Correctly completes form

9. References

1. Shephard RJ, Berridge M, Montelpare W. On the generality of the "sit and reach" test: an analysis of flexibility data for an aging population. Res Q Exerc Sport 1990 Dec;61(4):326-30.

2. Voorrips LE, Lemmink KA, van Heuvelen MJ, Bult P, van Staveren WA. The physical condition of elderly women differing in habitual physical activity. Med Sci Sports Exerc 1993 Oct;25(10):1152-7
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